WHAT IS CLAIMED IS:

1. A method for detecting at least one analyte using a recognition reaction, said method comprising the following steps:

(a) providing a device comprising:

(i) a measurement electrode with a biofunctional surface, the biofunctional surface having recognition elements for the analyte,

(ii) one or more counterelectrodes, and

(iii) a liquid electrolyte between the measurement electrode and the one or more counterelectrodes,

(b) bringing at least one analyte labeled with an electrically active labeling unit into contact with the biofunctional surface, the electrically active labeling unit either having been bound to the analyte before the analyte is contacted with the biofunctional surface or being bound to the analyte after the analyte is contacted with the biofunctional surface,

(c) applying (i) a time-varying voltage or (ii) a time-varying current between a first counterelectrode and the measurement electrode, and

(d1) either in case (c)(i) measuring the current or in case (c)(ii) measuring the voltage between the first counterelectrode and the measurement electrode, or

(d2) in case (c)(i) measuring the current or in case (c)(ii) measuring the voltage between a second or subsequent counterelectrode and the measurement electrode.

2. Method according to Claim 1, wherein the recognition elements are covalently or non-covalently immobilized on the measurement electrode.

3. Method according to Claim 1, wherein the time-varying voltage is an AC voltage or a pulsed voltage.

4. Method according to Claim 1, wherein the time-varying voltage is an alternating current or a pulsed current.

5. Method according to Claim 1, wherein the impedance between the measurement electrode and the first or another counterelectrode is determined.

6. Method according to Claim 5, wherein capacitance between the measurement electrode and the first, second or subsequent counterelectrodes is derived from the impedance measurement with the use of suitable equivalent circuit diagrams.

7. Method according to Claim 1, wherein a DC voltage is superimposed on the time-varying voltage.

8. Method according to Claim 1, wherein a direct current is superimposed on the time-varying current.

9. Method according to Claim 1, wherein the recognition reaction constitutes an immunoassay or a DNA assay.

10. Method according to Claim 9, wherein the recognition reaction constitutes an SNP assay.

11. Method according to Claim 1, wherein the electrically active labeling unit has been bound to the analyte before the analyte is contacted with the biofunctional surface, and an unlabeled analyte is also brought into contact with the biofunctional surface.

12. Method according to Claim 1, wherein an analyte molecule is labeled with a plurality of electrically active labeling units.

13. Method according to Claim 1, wherein the electrically active labeling unit has a dielectric constant in the range of from 5 to 15,000.

14. Method according to Claim 13, wherein the electrically active labeling unit has a dielectric constant in the range of between 10 and 1,500.

15. Method according to Claim 1, wherein the electrically active labeling unit has a size in the range of from 1 to 100 nm.

16. Method according to Claim 15, wherein the electrically active labeling unit has a size in the range of from 1 to 30 nm.

17. Method according to Claim 16, wherein the electrically active labeling unit has a size in the range of from 1 to 2 nm.

18. Method according to Claim 1, wherein the electrically active labeling unit is at least one of nanoparticles, metal complexes and/or clusters of conductive materials.

19. Method according to Claim 18, wherein the electrically active labeling unit is at least one of Au, Ag, Pt, Pd, Cu or carbon.

20. Method according to Claim 18, wherein the nanoparticles or clusters are made of titanates, materials which crystallize in a perovskite lattice, TiO_2 or lead compounds.

21. Method according to Claim 18, wherein the electrically active labeling unit is at least one of carbon nanotubes, nonconductive particles with a conductive coating or nonconductive particles with a metallic coating.

22. Method according to Claim 18, wherein the electrically active labeling unit is at least one of conductive polymers.

23. Method according to Claim 22, wherein the conductive polymers are polyanilines, polythiophenes, polyphenylenes, polyphenylene vinylene, polythiophene vinylene, or polypyrrole.

24. Method according to Claim 23, wherein the conductive polymer is polyethylene dioxythiophene.

25. Method according to Claim 1, wherein the labeling unit is one of enzymes which form electrically active labeling units by the reaction of a substrate.

26. Method according to Claim 25, wherein the labeling unit comprises horseradish peroxidase (HRP).

27. Method according to Claim 26, wherein horseradish peroxidase (HRP) catalyses the polymerisation of a conductive polymer or catalyses the deposition of a biotinylated polymer, to whose biotins labeling units can be bound via avidin, NeutrAvidin or streptavidin.

28. Method according to Claim 27, wherein the conductive polymer is polyaniline or polyethylene dioxythiophene.

29. Method according to Claim 27, wherein the electrically active labeling units are autometallographically enlarged.

30. Method according to Claim 29, wherein Ag or Au is used for the autometallographic enlargement.

31. A device for detecting at least one analyte using a recognition reaction, said device comprising:

(a) at least one measurement electrode with a biofunctional surface, the biofunctional surface having recognition elements for the analyte,

(b) one or more counterelectrodes,

(c) a liquid electrolyte between the measurement electrode and the counterelectrodes,

(d) at least one analyte, which is labeled with an electrically active labeling unit and is in contact with the recognition elements of the biofunctional surface,

(e) either (i) a voltage source for applying a time-varying voltage or (ii) a current source for applying a time-varying current between a first counterelectrode and the measurement electrode, and

(f) a measuring instrument for:

(i) measuring in case (e)(i) the current or in case (e)(ii) the voltage between the first counterelectrode and the measurement electrode, or

(ii) measuring in case (e)(i) the current or in case (e)(ii) the voltage between a second or subsequent counterelectrode and the measurement electrode.

32. Device according to Claim 31, wherein the recognition elements are covalently or non-covalently immobilized on the measurement electrode.

33. Device according to Claim 31, wherein the time-varying voltage is an AC voltage or a pulsed voltage.

34. Device according to Claim 31, wherein the time-varying voltage is an alternating current or a pulsed current.

35. Device according to Claim 31, wherein a DC voltage is superimposed on the time-varying voltage.

36. Device according to Claim 31, wherein a direct current is superimposed on the time-varying current.

37. Device according to Claim 31, wherein the electrically active labeling unit has been bound to the analyte before the analyte is contacted with the biofunctional surface, and an unlabeled analyte is also brought into contact with the biofunctional surface.

38. Device according to Claim 31, wherein an analyte molecule is labeled with a plurality of electrically active labeling units.

39. Device according to Claim 31, wherein the electrically active labeling unit has a dielectric constant in the range of from 5 to 15,000.

40. Device according to Claim 39, wherein the electrically active labeling unit has a dielectric constant in the range of between 10 and 1,500.

41. Device according to Claim 31, wherein the electrically active labeling unit has a size in the range of from 1 to 100 nm.

42. Device according to claim 41, wherein the electrically active labeling unit has a size in the range of from 1 to 30 nm.

43. Device according to claim 42, wherein the electrically active labeling unit has a size in the range of from 1 to 2 nm.

44. Device according to Claim 31, wherein the electrically active labeling unit is at least one of nanoparticles, metal complexes and/or clusters of conductive materials.

45. Device according to Claim 44, wherein the electrically active labeling unit is at least one of Au, Ag, Pt, Pd, Cu or carbon.

46. Device according to Claim 44, wherein the nanoparticles or clusters are made of titanates, materials which crystallize in a perovskite lattice, TiO_2 or lead compounds.

47. Device according to Claim 44, wherein the electrically active labeling unit is at least one of carbon nanotubes, nonconductive particles with a conductive coating or nonconductive particles with a metallic coating.

48. Device according to Claim 44, wherein the electrically active labeling unit is at least one of conductive polymers.

49. Device according to Claim 48, wherein the conductive polymers are polyanilines, polythiophenes, polyphenylenes, polyphenylene vinylene, polythiophene vinylene, or polypyrrole.

50. Device according to Claim 49, wherein the conductive polymer is polyethylene dioxythiophene.

51. Device according to Claim 31, wherein the labeling unit is one of enzymes which form electrically active labeling units by the reaction of a substrate.

52. Device according to Claim 51, wherein the labeling unit comprises horseradish peroxidase (HRP).

53. Device according to Claim 52, wherein horseradish peroxidase (HRP) catalyses the polymerization of a conductive polymer or catalyses the deposition of a biotinylated polymer, to whose biotins labeling units can be bound via avidin, NeutrAvidin or streptavidin.

54. Device according to Claim 53, wherein the conductive polymer is polyaniline or polyethylene dioxythiophene.

55. Device according to Claim 53, wherein the electrically active labeling units are autometallographically enlarged.

56. Device according to Claim 55, wherein Ag or Au is used for the autometallographic enlargement.

57. Device according to Claim 31, wherein the surface of the measurement electrode is divided into a plurality of conductive regions.

58. Device according to Claim 57, wherein the conductive regions are of planar configuration.

59. Device according to Claim 57, wherein the conductive regions have sizes in the range of from 1 to 20 x 1 to 20 μm^2.

60. Device according to Claim 59, wherein the conductive regions have sizes in the range of from 5 to 15 x 5 to 15 μm^2.

61. Device according to Claim 60, wherein the conductive regions have sizes of 10 x 10 μm^2.

62. Device according to Claim 57, wherein one type of recognition element is immobilized in each conductive region.

63. Device according to Claim 57, wherein the same type of recognition elements are immobilized in a plurality of conductive regions.

64. Device according to Claim 57, wherein a plurality of conductive regions, which respectively differ in their size by a factor, are in each case used for one type of recognition unit.

65. Device according to Claim 64, wherein the factor is in the range of from 5 to 15.

66. Device according to Claim 65, wherein the factor is in the range of from 9 to 11.

67. Device according to Claim 57, wherein the conductive regions are configured as channels in a substrate.

68. Device according to Claim 57, wherein a plurality of electrodes are configured laterally next to one another or vertically above one another in the form of layer structures.

69. Device according to Claim 57, wherein the conductive regions are configured in an alternating layer sequence of conductive and insulator layers as a microchannel in a substrate.

70. Device according to Claim 57, wherein the counterelectrodes or counterelectrode and a reference electrode are fitted on the same substrate as the measurement electrode(s).

71. Device according to Claim 70, wherein the substrate is one of glass, SiO_2, or plastic.

72. Device according to Claim 71, wherein the substrate is one of polyethylene terephthalate, polycarbonate, or polystyrene.

73. Device according to Claim 31, wherein the conductive regions consist of metals, semiconductors, metal oxides, or conductive polymers.

74. Device according to Claim 73, wherein the conductive regions consist of Au, Pt, Ag, Ti, Si, indium-tin oxide, polyethylene dioxythiophene, polyphenylenes, polyphenylene vinylene, polythiophene vinylene, or polypyrrole.

75. Device according to Claim 31, wherein a plurality of measurement electrodes form an array.

76. Device according to Claim 31, which is a DNA array or a protein array.